PROGRESS REPORTS

FROM

EXPERIMENT STATIONS

SEASON 1958-59

TANGANYIKA TERRITORY
EASTERN PROVINCE

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TANGANYIKA TERRITORY
EASTERN PROVINCE
PROGRESS REPORT FOR THE SEASON 1959

BY

R. SMITH, E. W. VALENTINE and J. E. CROSS

COTTON SEASON

Planting: February to April.
Picking: July to November.
Close season: November to February.
Rainfall (Ilonga): December to June, 36·55 inches.

INTRODUCTORY SUMMARY

Cotton Breeding

Advances have been made this year in all the major characteristics for an improved cotton (i.e. higher yield, better jassid resistance and higher G.O.T., with maintenance of the present lint quality). Combinations of improved strains will be tested next year in multiline lots for possible future issue to the Province. To test the intrinsic ability of strains to withstand insect attack, variety trials were planted at different locations, under conditions of heavy insect attack, mild insect attack, and where insects were controlled. The results, presented in detail later, are of considerable interest.

Agronomy

Trials again showed increased yields from early planting and insecticide applications. A significant response to fertilisers in cotton was demonstrated on a local cultivator's garden near Ilonga.

Cotton was grown successfully at the trial irrigation farms of the Rufiji Basin.

Variety trials were planted in Tanga and Northern Provinces to assess the best type of cotton for these areas.

Entomology

Records were kept of the insect pest populations in cotton and other host plants. The insects were American bollworm (*Heliothis armigera* Hbn.), spiny bollworm (*Earias insulana* Boisd.), stainers (*Dysdercus* spp.), *Calidea,* jassids (*Empoasca* spp.), termites, red spider mite (*Tetranychus bimaculatus* Harvey), and *Aphis gossypii* G.

Insecticide trials showed that ¾ lb. DDT per acre in 10 gallons of water, applied weekly for eight weeks, can give good economic control of insects provided it is applied efficiently and the crop is timely planted. Yields significantly higher than those given by any other treatment were achieved with 1 lb. DDT and 1 oz. Rogor per acre applied in the same way and at the same frequency. Possibly this was due to the observed highly efficient control of aphids, given only by this treatment, but the effect requires further study. Spraying bulk cotton with a tractor mounted boom-sprayer was successful.

Studies on the ability of the cotton to recover from early loss of buds continued.

Ilonga Station

Meteorology.—Conditions for cotton growing were good this season. The rains stopped early in May but the total was up to average.

RAINFALL IN INCHES, DECEMBER 1958 TO JULY 1959

Dec.	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*	
3·77	7·49	7·58	10·78	3·96	2·97	Nil	Nil	=36·55

Staff, visitors and visits.—Mr. R. Smith was absent on vacation leave from March until July 1959. Mr. E. W. Valentine resigned in September. Mr. J. E. Cross arrived in October to assist Mr. Smith. Visitors to the station included Mr. J. E. Peat, C.B.E., then Chief Scientific Officer, E.C.G.C.; Mr. A. P. S. Forbes, Director of Agriculture, Tanganyika; Dr. A. C. Evans, Chief Research Officer, Tanganyika, and Dr. G. M. Wickens, Chief Scientific Officer, E.C.G.C.

All cotton areas in the coastal region were visited and Mr. Valentine visited the irrigation trial farm at Rujewa. Mr. Smith and Mr. Cross attended a meeting of representatives of the Department of Agriculture, the Lint and Seed Marketing Board and the Empire Cotton Growing Corporation to discuss future breeding policy.

Cotton Growing—Eastern Province

About 14,000 bales of cotton were produced this year. Early planting is now accepted as routine practice. Insecticide is being used on an increased scale in Bagamoyo district where the people are interested and the Departmental staff keen. Elsewhere the expected increase in the use of insecticide has not materialised. Spraying is superseding dusting. The level of insect attack appears to have diminished over the past few years, although it is still relatively high.

Il58 is being multiplied throughout the Province. This year it has given large increases in yield and 1·9% increase in the commercial ginning outturn compared with 47/10. In the opinion of the Lint and Seed Marketing Board and the Lancashire Cotton Corporation the lint quality of Il58 is as good as that of 47/10.

Plant Breeding and Agronomy

BY

R. SMITH and J. E. CROSS

The season was good for cotton growing despite the early cessation of the rains. Insect attack was less severe than usual except on one or two district plots. Early planting and use of insecticide were again shown to be essential for better yields of cotton in the majority of places.

Table 1

Mean yields seed cotton lb./acre from district variety trials

To show the effect of planting date and insecticide use on yield

*Routine insecticide applications**

District	*February planted*			*March planted*
	Spray	*Dust*	*No insecticide*	*No insecticide*
Ilonga	2102	1930	927	Not picked
Kisaki	1332	1320	1003	984
Mikese	2082	1807	802	422
Handeni	1439	1568	625	652
Miono (1)	1195	1132	1182	854
Miono (2)	1280	996	472	472
Kiberege	1486	890	277	140
Means	1557	1377	755	587 (excluding Ilonga)

*for definition see Appendix.

Manurial Trial

This trial was planted in a local cultivator's garden adjoining the research centre. A preliminary trial was carried out on this site last year, using only sulphate of ammonia. This year, combinations of farmyard manure, nitrogen and phosphate were tested.

Table 2

Manurial trial

2^3 factorial. 4 replications. Plot size: 1/48 acre. Planted: 5th February 1959. Variety: I158. Routine insecticidal spraying (see Appendix). Site previously cropped for 10 years. Spacing 3 feet between rows, one foot between plants, thinned to 1 plant per hill.

Treatments

FYM: Nil and 5 tons/acre manure, applied at planting.
N: Nil and 2 cwts./acre sulphate of ammonia applied at flowering.
P: Nil and 75 lb./acre phosphate applied at planting.

Yield in lb./acre seed cotton

	Farmyard manure		
	Absent	*Present*	*Mean*
	±86		±61
P and N absent	1020	1032	1026
N alone	1032	1272	1152
P alone	1212	1476	1344
P and N together	1344	1452	1398
	±43		
Mean	1152	1308	

Phosphate (composition not known) gave a highly significant increase in yield by itself, and consistent increases with nitrogen and FYM. Nitrogen and FYM alone had almost no effect but together a considerable one. The combination of phosphate and FYM gave the largest response but phosphate, FYM and nitrogen together gave an increase almost as large.

The site washed badly during the rains and this probably affected the results. The large responses due to phosphate indicate that phosphorus may be a limiting factor on soils cultivated for a number of years in this area. Previous fertiliser trials grown on the research centre have shown no responses. These trials were conducted on land cropped for only one year. Further trials have been started over a wider range of conditions to clarify the position.

On the same garden a weedicide, Geigy 30'027 50% wettable powder, was tested. It was applied at planting at 2, 4, 6 and 8 lb./acre each in 50 gallons of water per acre. The 4 lb./acre application was the most effective; no weeds were seen for 6 weeks and no scorching of the cotton occurred. The 2 lb. dose did not control the weeds and the 6 lb. and 8 lb. doses scorched the cotton leaves.

Demonstration Plots

A series of eight demonstration plots was planted. These ranged from badly cultivated plots (i.e. late planted, badly spaced and not thinned, not weeded, no use of insecticide) to well cultivated (i.e. early planted, thinned early at the recommended spacing, early clean weeded and sprayed with insecticide). Several parties of visitors were instructed at these plots by extension officers.

Bacterial Blight (Xanthomonas malvacearum)

The incidence of bacterial blight has become more noticeable over the last 3 years. The earlier planting régime has now been recommended for 5 years and has been widely practised for the past two seasons. Earlier planting (early February) is likely to provide more favourable conditions for the spread of the disease than later planting (mid March), as the main rains fall during March and April in Eastern Province. With successive years of early planting a gradual build-up in the level of infection may occur.

A seed dressing trial was planted this season to see whether control of seed-borne disease, mainly bacterial blight, gave increases in yield. Six organo-mercurial seed dressings, applied at 1 : 150, all considerably reduced primary infection (0·2 to 4·5% infected plants as compared

with 31·7% in the untreated control 6 weeks after planting). Subsequently secondary infection spread throughout all the plots. Advantages in yield accruing from the seed dressing would have been obscured to some extent by the spread of disease from the control plots. Nevertheless the mean yield of the plots treated with organo-mercurial seed dressings was 13% better than that of the control plots.

The question is to be examined more fully in the coming season. Resistant material is to be imported and tested, inoculation techniques, etc., are to be tried out and a general survey is to be attempted in an effort to assess the amount of crop loss due to this disease. The picture is somewhat obscured by the pest attack but testing types resistant to bacterial blight against non-resistant types should provide some information on the level of damage caused by the disease.

Plant Breeding

At Ilonga, the programme of selection and testing of improved strains for Eastern Province continued. The main aims remain as improved jassid resistance, higher yield, higher ginning outturn and lint index and early maturity, with maintenance of the present lint quality.

Using the pedigree selection system a further 330 selections were taken from the best of the 1957 selections this season. 101 will be planted in bulking observation plots next year. The 1958 selections, taken from the 1956 selections, were planted in small plots this year and 248 discarded. 67 remain to enter yield trials on Ilonga next year.

The picture emerging from these later selections is one of considerable uniformity within each selection, considerable increase in ginning outturn, improvements in jassid resistance and higher lint index.

All strains remaining from the selections made up to 1957 were planted in a large variety trial at Ilonga. This gave a direct comparison of material to facilitate discarding, as sufficient information is now accruing for a decision to be reached on the most suitable type of plant for the area. The initial process of 'sorting out' from a very variable stock is almost complete. Activity can now be concentrated on a few main families.

The advances demonstrated by this trial are shown in Table 3. Mean date of maturity was obtained by calculating, for each picking, amount per picking multiplied by the days from the first pick, summing these, and dividing by the total yield.

TABLE 3

SELECTION WITHIN SUPERIOR FAMILIES, MEAN PROGENY VALUES

54/57 variety trial, Ilonga 1959

9 × 9 balanced lattice, 10 replications, testing 81 strains. Plot size: 1/484 acre. Spacing: 3 feet between the rows, one foot between plants, thinned to one plant per hill. Sprayed with the routine insecticide treatment (see Appendix).

Family	*No. of selections*	*Yield lint lb./acre*	*G.O.T. %*	*Yield lint as % I158*	*Lint index*	*Mean date of maturity*	*Jassid resistance rating*
48/64	8	552	33·4	113	5·1	18·0	V. good
51/77	5	535	31·1	110	4·5	19·1	Good
51/111	10	548	31·6	112	4·5	16·3	Good
I158		488	30·1	100	4·4	17·4	Good
47/10		316	29·4	65	4·3	19·4	Poor
S.E. (single strain totals)		±35		±7			

Main Variety Trials: Ilonga and District Plots

The best seven selections of former years were tested at six sites in Eastern Province and at Handeni in the Tanga Province. All trials were successful; the results showed that several strains were superior in all characters over the controls, I158 and 47/10. I158, which is being multiplied for general distribution in the Province, showed a large increase in yield over 47/10 and an average increase of 1·2% in ginning outturn from the district plot results.

The Lancashire Cotton Corporation kindly tested the lint of these two varieties and concluded that there was little difference between them, but on finer judgment preferred the I158. Thus the aim of the programme — to maintain the present lint quality — has been achieved in this latest higher yielding issue.

These trials were repeated 3 times at each site. Trial one was planted early in February and sprayed with insecticide. Trial two was also planted early in February, 2 replications being dusted with insecticide giving partial control, and 2 replications being left undusted. Trial three was planted in mid March and no insecticide was used.

The basis of these trials was to test the behaviour of the competing strains under conditions: —

(a) free from insect attack,
(b) where insects were partially controlled,
(c) where no control of insects was exercised.

The late planting effects were also considered. The results are shown in Table 4. Standard errors and least significant differences are given only for Handeni, as for simplicity the results of the other 6 trials have been grouped. Detailed statistics were, of course, worked out for each individual trial,

TABLE 4

SUMMARISED RESULTS OF MAIN VARIETY TRIALS

Trials each of 9 strains tested in a 3 × 3 balanced lattice, 4 replications. Plot size: 1/242 acre. Spacing: 3′ × 1′, thinned to one plant per hole.

Yield of lint as % 47/10

Average of 6 trials

Strain	*February planted all sprayed*	*February planted half dusted*	*March planted* no insecticide*	*Mean ginning %*
54/275	120	150	119	31·5
295	106	129	136	31·6
218	123	138	130	33·1
56/86	115	140	113	30·5
161	103	118	112	31·6
162	108	128	136	32·0
182	100	116	118	31·4
Il58	109	131	111	30·9
47/10	100	100	100	29·8
Mean lint yield	485 lb.	345 lb.	183 lb.	
Mean ginning %	30·7	31·1	32·6	

*excluding Ilonga, where March planted cotton was not picked.

Yield of lint as % Il58

Handeni only

54/275	120	119	92	32·8
295	97	96	107	33·1
218	116	89	107	33·8
56/86	112	90	99	31·7
161	92	87	95	32·8
162	103	99	88	33·0
182	98	86	90	32·7
Il58	100	100	100	31·6
Uk51	121	77	79	31·8
Mean lint yield	466 lb.	355 lb.	217 lb.	
Mean ginning %	32·4	32·3	33·3	
S.E.	±7	±7	±6	
L.S.D.5%	20	21	N.S.	

Yield of lint per acre by areas

Average ginning % in brackets

Ilonga	633 (30·2)	431 (30·2)	Nil —	
Kisaki	390 (29·1)	344 (29·6)	304 (30·8)	
Mikese	654 (31·4)	412 (31·4)	144 (34·2)	
Miono 1	366 (30·7)	355 (30·7)	268 (31·4)	
Miono 2	396 (30·9)	312 (31·5)	147 (31·0)	
Kiberege	472 (31·7)	215 (33·2)	50 (35·6)	
Handeni	466 (32·4)	355 (32·3)	217 (33·3)	

This is the first year that potential future issues have been tested at different levels of insect attack, at different planting dates in the various localities.

In producing better yielding varieties for this area, where heavy insect attack is likely annually, intrinsic yielding ability is not the sole criterion of an advance in yield. Ability to recover from insect

damage by rapid proliferation of bolls, and ability to produce a crop rapidly and thus avoid the continual ravaging that would occur with a slower maturing crop are major points of importance.

These points have been tested this year. The extreme case can be seen from the results obtained at Handeni for Uk51. This Lake Province variety is more jassid resistant, leafier and slower maturing than Il58. It was bred under fairly dry conditions for an area where insect attack is negligible. In trial 1 (insects controlled) it gave the highest yield. In trials 2 and 3, where insects were not controlled, its yield was considerably lower than that of Il58.

Ginning outturn of the new strains tested showed a good increase over 47/10. Again differences among strains are apparent between the three trials for this factor. The general mean for G.O.T. of each trial varied consistently and was considerably higher for the mid March planting.

Several strains did extremely well in these trials and various combinations of 54/275, 54/218, 56/86 and 56/162 are to be grown next year as multiline lots for testing as possible issues to the Province eventually.

Lint samples are to be sent to the Shirley Institute from the trials planted at Mikese to obtain data on any differences resulting from the different growing methods.

Selection Index

Last year's programme was continued by testing twenty progenies from five strains and three lines. These were planted with Il58 in randomised blocks with five replications and plot size 1/1446 acre. An index was computed using the 3 components of yield, i.e. bolls per plant, seeds per boll and lint per seed.

The index selected types with many bolls per plant, few seeds per boll and much lint per seed. After selection on the basis of the index, the remaining progenies were culled for low ginning outturn. A total of 4 progenies was selected and nineteen selections were taken from the selfed rows of these progenies. These selections represent a genetic advance of 3·7% over the parent material.

Much improved, uniform strains with good yield characters have been made available by the pedigree selection system. Further testing of these is now required. The genes in the gene pool are now restricted to provide the most suitable plant type for this area. The variation in characters measurable by eye is becoming more difficult to assess. Following the next seed issue to the Province few more major advances can be expected. Subsequently, advances will consist of minor progressive improvements. For this the selection index technique will be increasingly important in detecting and selecting for these minor advances.

Bulk Plots

At Ilonga all strains were planted in small plots and selfed. They were also planted in a further field at Ilonga, and no insecticide was used so that accurate assessment of jassid resistance could be made. The 1957 and earlier selections were all planted in bulking plots. These plots were successfully sprayed by a tractor-mounted sprayer.

Irrigation—Rufiji Basin Trial Farms

Cotton was grown in conjunction with the Tanganyika Agricultural Corporation to try to assess the optimum water application rates at Rujewa in the Buhora flats and at Beta in the Rufiji delta. The results at Rujewa were not consistent, owing to lack of equipment to measure the amount of water supplied and to heterogeneity of the soil. However, in some plots yields were high, up to 2,500 lb./acre seed cotton.

Time of planting trials over the last 2 years have shown that plantings between mid December and early January give the highest yields. As the rains begin in December, the effects of application of water to supplement the rainfall were examined. Yields from these treatments were good. Insecticide use was essential.

The aim of these trials is to use water as economically as possible without adversely affecting yields. Plots were also planted with a wider spacing between rows of cotton to provide ease of access for insecticide applications and picking. Similar trials will be conducted next year.

At Beta a similar set of trials was planted, although later. Yields were lower than at Rujewa (up to 1,400 lb./acre seed cotton). No particular trends were noted from the treatments.

Northern and Tanga Provinces Variety Trials

A series of variety trials was planted in Lushoto, Pare, Moshi and Arusha districts to discover which is the most suitable source for seed supplies for these areas. At the moment Uk51 and BP52 are the two strains mainly grown.

The trials consisted of 9 strains, 2 from Ukiriguru, 3 from Uganda, 3 from Ilonga and the local seed used as a control at each site. The design was a 3 × 3 balanced lattice with 4 replications and plot size 1/242 acre.

The trials at Moshi, Arusha and Pare were irrigated. The results of the Tanga Province trials were unreliable, this being the first year in which trials have been established in this area and the consequent difficulties of a new project having to be settled. In future years the results should be of considerable value.

At Arusha no recurrence of last season's red spider mite attack occurred. Yields were high at the Arusha and Moshi plots.

TABLE 5

MEAN YIELD SEED COTTON LB./ACRE, NORTHERN PROVINCE VARIETY TRIALS.

Trials planted 27th March 1959. Supplementary irrigation.
Routine insecticide applications (see Appendix)

	Sprayed	*Dusted*	*No insecticide*
Arusha	2319	1623	1522
Moshi	2574	2676	2074

The variety trials indicate that varieties of Ilonga origin did well. The locally adapted form of BP52 also did well, Ukiriguru varieties were good, and NC56 from Uganda gave the lowest yield. It would appear that the intensive breeding in Uganda has produced a variety very well adapted to its required local conditions and consequently less well adapted for use in areas distant from its home.

GENERAL ENTOMOLOGY

BY

E. W. VALENTINE

A feature of the 1958 season was the almost complete lack of rain from early May till the middle of December. The last record of *Heliothis* larvae was in late September, when a small number were found in pigeon pea (*Cajanus indicus*) and *Dolichos lablab*. Soon after the first rains, that is, in the last week of December, a few small larvae were found in regenerated groundnuts, and during the following month very large numbers in *Mollugo nudicaulis, Tridax procumbens* and groundnuts, as these plants came into flower. This sudden build-up, and previous records of larval increase soon after rain, lend support to the importance of diapausing pupae in the carry-over of this pest from one season to the next. The heavy infestation of *Tridax* and *Mollugo* was probably due to attraction of the laying moths to these freely flowering plants in the absence of other suitable cultivated hosts. In both plants only the flowering heads were eaten, which are thought not to be suitable for complete development. All larvae fed in the laboratory produced small pupae and undersized adults. Larval mortality was higher than in samples from other plants, and of those which remained, most were parasitised. When the rate of flowering declined in *Tridax*, egglaying shifted to cultivated groundnuts, during late February and March. In the many collections made, over 50% were parasitised, particularly by tachinids. Maize flowering in March was the next host in succession, but the infestation was much lower than is usual.

Very light egglaying by *Heliothis* took place in cotton from early April. The infestation built up very slowly and did not reach the high levels experienced in previous years. Early fruits were not extensively damaged and where *Earias* attack was low, unsprayed cotton gave reasonably good yields. Late season hosts in August and September were again pigeon pea and *Dolichos*.

Spiny bollworm (*Earias*) was responsible for the main loss of crop. It was kept in check by spraying, but was not found to be as effectively controlled as *Heliothis*.

Stainers (*Dysdercus* spp.), particularly *D. intermedius,* were present in the crop throughout the growing period, but did not start breeding until July when harvesting had begun. The amount of staining was negligible. In April, large numbers of *Calidea* entered the crop, but with the start of spraying at the end of the month they almost completely disappeared.

Jassid infestation was remarkably low, only the most susceptible strains being affected.

Termites were troublesome in a part of the experimental area which was newly opened from fallow. Seedlings were attacked directly, especially where they had been knocked down by wind or surface water. Spraying with 0·2% BHC at the bases of the plants checked the spread of the attack.

Owing to the long dry period before harvesting, the aphid build-up was more marked than usual. Only DDT was used in protection of the main bulks, etc., and this may have been a contributory factor. However, in an insecticide trial the inclusion of BHC did not lead to any significant increase in yield.

Red spider mite, although on the increase late in the season, was of no importance. Again castor seemed to be the more favoured host.

Insecticide Trials

BY

E. W. VALENTINE

A generally recommended spray treatment for African growers is $\frac{3}{4}$ lb. DDT per acre, in 10 gallons of water, per week for a protection period of two months. This is a compromise between the more efficient methods of control and the amount that the peasant farmer is prepared to spend on insecticides. A relatively low rate such as this must be efficiently applied to give good control, and its value depends on the avoidance of aphid and stainer attack by timely planting.

A small trial was conducted, applying DDT at the rates of $\frac{1}{2}$ lb., $\frac{3}{4}$ lb., and 1 lb. per acre, and 1 lb. DDT with $\frac{1}{4}$ lb. BHC or 1 oz. Rogor. A full scale biological assessment and a record of fruiting pattern which

were planned were not possible with the limited staff and time available, but some interesting results were obtained.

TABLE 6

Spacing: single plants at 1 ft. spacing in 6 ft. rows. Each alternate row sprayed. Plot size: 1 row of 145 ft. Layout: randomised blocks.

Replications: 5. Equipment: Kestrel (2 gallons) sprayer.

Variety: I158.

Treatments: A. ½ lb. DDT per acre in 10 gallons water
B. ¾ lb. DDT per acre in 10 gallons water
C. 1 lb. DDT per acre in 10 gallons water
D. 1 lb. DDT + ¼ lb. BHC in 10 gallons water
E. 1 lb. DDT + 1 oz. Rogor in 10 gallons water
F. Unsprayed interspersing alternate rows (5 selected at random for yield figures).

All treatments weekly for 8 weeks, beginning in the last week of April. Yield in pounds of seed cotton per treatment, i.e. equivalent to 1/10th acre with half the normal plant population. Other records as averages per plant in samples taken from one week before until one week after the spraying period. Percentage grade is of all bolls harvested. Samples taken from 10 plants in each plot.

Treatment	*Yield lb. seed cotton per treatment*	*Damaged fruits*	*Undetermined + shed losses*	*Total losses*	*Bolls harvested*	*% grade I*
	Total					
A	126	32·1	49·3	81·4	26	67
B	137	28·6	43·3	71·9	28	69
C	147	27·8	47·7	75·5	31	76
D	154	22·9	41·5	64·4	31	80
E	174	21·7	39·7	61·4	32	76
Control F	121	30·6	40·9	71·5	24	72
S.E.	5·3					

An interesting outcome of this trial is that the yield from the treatment containing Rogor was significantly higher than from any other treatment. The reasons for this better control are not fully understood. Counts of flared squares and of boll damage due to bollworm were lower than in the other high level treatments, but not significantly so on analysis of sample records. Aphids were very effectively controlled. This, combined with the control of other sucking insects, may have been responsible for the increased production. Other possibilities may be a temporary repellent effect on the laying moth, or actual control of the bollworm larvae. This is a problem which is worthy of further study.

The inclusion of BHC did not lead to a yield which was significantly greater than from DDT alone. Aphids were checked, but not controlled as with Rogor. In this trial the yield from the 1 lb. DDT treatment was not significantly greater than that from the ¾ lb. DDT treatment. It seems that the lower rate of application, if efficiently applied to well grown cotton, will give a good control and a satisfying return to the farmer. Large scale application of ¾ lb. of DDT alone has proved to be successful this season.

The harvesting pattern was similar in all treatments, but at different levels, except that the decline in the unsprayed cotton was more rapid. This is consistent with the generally light infestation in the first half of the boll formation period, and the increasing spiny bollworm damage later in the season. These unsprayed rows cannot be regarded as controls, owing to interferences from adjacent sprayed plots.

Tractor Mounted Boom-sprayer

This season the bulk multiplication plots were successfully sprayed with a tractor mounted boom-sprayer. The purpose of the test was to find a satisfactory method of protecting large areas of bulk and experimental cotton, using power driven equipment, and to minimise the amount of hand labour and supervision normally required.

The machine used was a modified Pest Control Weedmaster sprayer mounted on a vertical frame so that the boom height could be increased, by 3-inch stages, up to a maximum of 6 feet. Cotton was arranged in six-row strips with a gap of two unplanted rows to allow for tractor access. It is not possible to drive through the crop, owing to the extreme height of the plants. Nozzles were arranged to spray over three rows on each side of the tractor, with one nozzle directed over each row, and one between the rows.

At 40 lb. pressure in second gear, the rate of output was approximately 10 gallons per acre, with a normal working time of just under 4 acres per hour.

This method gave satisfactory control, probably better than the equivalent treatment with labour using knapsack sprayers. Some modification in nozzle size and arrangements, and possibly higher volume application, would give more efficient coverage.

The Recovery of Cotton from Loss of Crop

As a continuation of last season's work on compensation for loss of crop, a similar trial was conducted to measure the recovery of plants when fruiting bodies were removed at different times during the season. In a plot of single plants arranged at 6 ft. × 6 ft. spacing, twenty-five were taken at random for each of the four treatments. Treatments consisted of:—

A.—No bud removal.

B.—All buds removed at first flowering.

C.—All buds removed after 4 weeks of flowering.

D.—All buds removed after 7 weeks of flowering.

Plants were left to recover after disbudding. Time did not permit of daily or weekly disbudding over a period, which would have been nearer to the effect of insect damage, and all were taken off on one day in each treatment.

Accurate daily records of flowering and weekly records of losses of both buds and bolls were made, and an analysis of the conditions of every opened boll. These records are very briefly summarised in the following tables.

TABLE 7

AVERAGE PRODUCTION PER PLANT

Of the fruiting bodies lost, "removed" are buds only; "shed" are buds and bolls including a small proportion (4% to 5%) damaged by insects. Variety: 1158.

Treatment	*Fruit recorded*	*Fruits lost*			*Fruits harvested*		
		Removed	*Shed*	*Total*	*Total*	*Saleable*	*Grade 1*
A	401	—	225	225	176	159	143
B	508	37	295	332	176	160	145
C	546	160	246	406	140	125	114
D	405	144	105	249	156	144	130

TABLE 8

AVERAGE FLOWER PRODUCTION AND BOLLS HARVESTED PER PLANT

Treatment	*Flower production*			*Mature bolls from*		
	First flowering	*Second flowering*	*Total*	*First flowering*	*Second flowering*	*Total*
A	362	—	362	176	—	176
B	416	—	416	176	—	176
C	42	270	312	42	98	140
D	174	46	220	140	16	156

In the naturally developing plants (treatment A) 56% of the fruiting bodies were lost through shedding. 83% of the losses were of small bolls, most falling at the time when the first bolls were nearing maturity, that is, eight to eleven weeks after first flowering.

In treatment B, i.e. those plants from which all buds were removed at the time of first flowering, the immediate reaction was a rapid production of buds. Eventually, a greater number of fruits was produced, but as the losses were higher, the final number of bolls harvested was the same as in Treatment A. 82% of the losses were of small bolls.

When buds were removed after four weeks of flowering, the plants were carrying 42 bolls. None of these was shed. In compensation for the loss of buds, the plants produced an average of 344 further fruiting bodies, 270 of which came to flowering, and only 98 matured as open bolls (25% of the fruiting bodies formed). A greater number of buds (30%) was shed than in the earlier fruiting treatments.

In seven weeks' flowering, the plants of treatment D had produced 174 flowers, of which 140 matured. The subsequent compensation was extremely variable, some plants not making any more fruiting bodies, and yielding an average of 46 flowers per plant. 16 of these matured as open bolls. Losses as buds were proportionately higher, almost 40% compared with the 17% loss from naturally developing plants.

Appendix

Summary of strains

Eastern Province Local	The original commercial cotton in the Province, mainly of Uganda Local origin. Strains prefixed by the figures 44-59, which indicate the year of origin, are all selections or reselections from Local.
47/10	A selection from Local; the current commercial cotton of the Province.
1158	A multiline issue composed of 7 strains with improved yield and ginning outturn. At present being multiplied to replace 47/10.
Uk51	A multiline strain of cotton developed at Ukiriguru and currently grown in the Handeni district of Tanga Province.
BP52	The present commercial cotton in Northern Province, having been imported from Uganda.
NC56	A multiline strain of BP52 developed at Namulonge.

Routine insecticide treatment

Dust	10% DDT plus 3% BHC applied once a week at 10 lb. per acre. Applied with Swaine dusters or rotary dusters at the onset of insect attack.
Spray	DDT (emulsion) at the rate of 1 lb. DDT (in 6 gallons of water) per acre per week, plus ¼ lb. BHC if required for control of aphid, using knapsack sprayers. Lower rates than 1 lb. DDT still give adequate control but effectiveness decreases below that rate.

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PROGRESS REPORTS FROM EXPERIMENT STATIONS

The reports for the seasons up to and including 1950-51 were published in seasonal volumes; the following are still in print and available at 3/- per volume post free.

1923-25 (one volume), 1926-1927, 1931-32, 1934-35,
1935-36, 1942-43 and 1945-46 to 1950-51.

From 1951-52 the reports from each territory were published individually each season. A few of the 1951-52 reports are out of print, but all others are available post free at 1/- per report or 7/6d. for the seasonal set.

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